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Self-reported Health and Well-being Outcomes of ASERE Students

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Defence R&D Canada – Toronto
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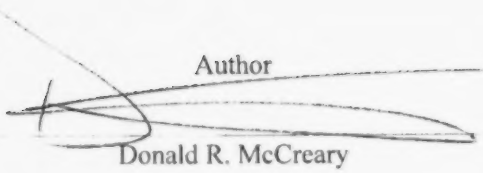

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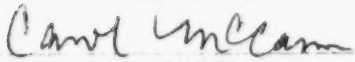

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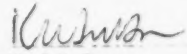

K. M. Sutton

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Abstract

The 1st Canadian Air Division Surgeon requested that the Stress and Coping Group at DRDC Toronto undertake an evaluation based on the health and well-being self-reports of students taking the Advanced Survival, Evasion, Resistance, and Escape (ASERE) training course conducted at Canadian Forces School of Survival and Aeromedical Training (CFSSAT), CFB Winnipeg. Students provided their expectations and perceptions concerning the course, as well as self-reports of their health and well-being prior to the course, at the end of the course, and six weeks following the course. While most students sustained some minor injuries (e.g., bruises, cuts, scrapes, sore muscles), only 3 of the 52 study participants sustained a major injury (i.e., broken bones, torn ligaments). Also, while there was a slight drop in physical health scores (using a standardized measure) from pre- to post-course, there were no effects on the two measures of psychological well-being. Finally, questions about expectations and perceptions of the course showed that students were expecting to take a challenging course and that those expectations were met.

Résumé

Le médecin de l'air de la 1re Division aérienne du Canada a demandé que le Groupe du stress et des stratégies d'adaptation de RDDC Toronto procède à une évaluation basée sur les auto-évaluations de leur santé et de leur bien-être par les participants au cours de formation sur les procédures avancées de survie, d'évasion, de résistance et de fuite (SERF), donné à l'École de survie et de médecine de l'air des Forces canadiennes (ESMAFC), BFC de Winnipeg. Les stagiaires ont exprimé leurs attentes et leurs perceptions concernant le cours, de même qu'ils ont fourni leur évaluation de leur santé et de leur bien-être avant le cours, à la fin du cours et six semaines après la fin du cours. Bien que la plupart des stagiaires aient subi des blessures mineures (p. ex. ecchymoses, coupures, éraflures, douleurs musculaires), seulement trois des 52 participants étudiés ont subi une blessure grave (c.-à-d. fractures, ligaments déchirés). De plus, bien qu'on ait observé (au moyen d'une mesure normalisée) des scores légèrement plus faibles dans l'évaluation de la santé physique à la fin du cours comparativement à ceux indiqués avant le cours, aucun effet n'a été révélé par les deux mesures du bien-être psychologique. Enfin, les questions sur les attentes et les perceptions concernant le cours ont démontré que les stagiaires s'attendaient à suivre un cours exigeant et que ces attentes ont été satisfaites.

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Executive summary

Background. Aircrew are required to be proficient in a wide variety of survival skills in case they should crash or have to egress from their aircraft in wilderness areas. Additional survival skills targeting evasion, resistance and escape are required in case a crash occurs behind enemy lines. Thus, the Advanced Survival, Evasion, Resistance, and Escape (ASERE) course is provided to all Canadian Forces (CF) aircrew that require these skills. The ASERE course is run several times each year by the Canadian Forces School of Survival and Aeromedical Training (CFSSAT), 17 Wing, Winnipeg. Because of the demanding nature of the course, all students are required to have a medical clearance before taking the course.

However, even though the students are cautioned about the difficult nature of the course, and are cleared for participation by their Medical Officer, injuries may occur. While serious injuries may be tracked through the CF medical system, the nature, duration (e.g., short- versus long-term), and types of general injuries sustained as a result of the ASERE course have not been systematically assessed. Similarly, the incidence of psychological distress resulting from the ASERE course has not been studied.

Thus, in January 2004, the 1st Canadian Air Division Surgeon requested that the Stress and Coping group at DRDC Toronto examine and evaluate the impact of the ASERE course on the short- and longer-term health and well-being of the students. The tasking request can be found in Annex 1.

Participants and Procedure. 52 students, recruited from three consecutive ASERE courses, volunteered to participate in a three-phase survey. Immediately before the course began, students completed questionnaires assessing physical and mental health (SF-12) and psychological distress (K-10). The students also rated their expectations for how physically and mentally demanding the course would be. Immediately following the course, the students again completed the SF-12 and K-10 questionnaires, as well as questions about their perceptions of how demanding the course was and the amount of physical contact used by the enemy force during the capture, transfer, and tactical questioning phases of the course's practical component. The students also reported all injuries (both minor and major) that they experienced as a result of the course. Finally, six weeks after the course concluded, the students answered the same questionnaire as they had completed immediately post-course, with one exception: the injury question this time asked them to report any injuries that surfaced after they returned home, as well as any injuries that were a result of the course, that were still having a negative impact on their life and their ability to do their work.

Results. 1. Physical health scores, as measured by the SF-12, declined somewhat from the pre-course assessment to the post-course assessment.

2. While most students reported some minor injuries (e.g., cuts, scrapes, bruises, sore muscles), only 3 of the 52 students experienced a major injury (i.e., broken bone, torn ligaments or tendons).

3. Participation in the ASERE course had no significant effect on students' psychological well-being, as measured by either the SF-12 or the K-10, either immediately after or six weeks following completion of the course.

4. Most students had realistic expectations for how difficult the course would be, though students perceived the course to be somewhat more difficult immediately after they finished the course, compared to how they remembered it to be six weeks later.

5. Almost all students felt comfortable with the level of physical contact used by the enemy force during the capture, transfer, and tactical questioning phases of the course's practical component. In fact, most students expected more physical contact than they received.

Conclusion. In summary, the ASERE course is not without some degree of risk. However, according to student self-reports, the majority of these risks were negligible, resulting largely in minor injuries, although 3 major injuries were reported. Moreover, the course appeared to have no long-lasting impact on the health or well-being of these ASERE students. These students appear to be aware of the risks prior to taking the course, as reflected in their expectations concerning the demanding nature of the upcoming ASERE course. The course appeared to be consistent with those expectations, as evidenced by their perceptions immediately after the course. Further, students recalled the course as less demanding six weeks after its completion.

McCreary, D.R., & Thompson, M.M. (2005). Self-reported Health and Well-being Outcomes of ASERE Students. DRDC Toronto TR 2005-100. Defence R&D Canada – Toronto.

Sommaire

Contexte. Les membres du personnel navigant des Forces canadiennes (FC) doivent maîtriser diverses techniques de survie au cas où leur avion s'écraserait ou au cas où ils devraient évacuer leur avion dans des régions sauvages. Ils doivent connaître d'autres techniques de survie axées sur l'évasion, la résistance et la fuite au cas où leur avion s'écraserait derrière les lignes ennemies. C'est pourquoi ils doivent tous suivre le cours de formation sur les procédures avancées de survie, d'évasion, de résistance et de fuite (SERF). Ce cours est donné plusieurs fois chaque année par l'École de survie et de médecine de l'air des Forces canadiennes (ESMAFC), 17e Escadre, Winnipeg. Compte tenu de la nature exigeante du cours, tous les élèves doivent subir un examen médical avant de suivre le cours.

Cependant, même si les stagiaires sont informés de la nature exigeante du cours et sont jugés physiquement aptes à suivre ce cours par leur médecin militaire, des blessures peuvent survenir. Bien que les traumatismes graves soient éventuellement recensés par le biais du régime médical des FC, la nature, la durée (p. ex. courte ou longue période) et le type des traumatismes généraux subis dans le cadre de la participation au cours SERF n'ont pas été systématiquement évalués. De la même manière, l'incidence de la détresse psychologique associée au cours SERF n'a fait l'objet d'aucune étude.

Par conséquent, en janvier 2004, le médecin de l'air de la 1re Division aérienne du Canada a demandé que le Groupe du stress et des stratégies d'adaptation de RDDC Toronto examine et évalue les répercussions du cours SERF sur la santé et le bien-être des élèves, à court et à long terme. L'attribution des tâches est présentée dans l'annexe 1.

Participants et procédure. Cinquante-deux stagiaires, recrutés parmi les participants à trois cours SERF consécutifs, se sont portés volontaires pour participer à une enquête en trois phases. Immédiatement avant le début du cours, les stagiaires ont rempli un questionnaire évaluant leur santé mentale et physique (SF-12) et leur détresse psychologique (K-10). Les stagiaires ont également exprimé leurs attentes quant à la difficulté du cours sur les plans physique et mental. Immédiatement après la fin du cours, ils ont rempli de nouveau les questionnaires S-12 et K-10, de même qu'ils ont répondu à des questions sur leurs perceptions quant aux exigences du cours et au nombre d'attaques physiques de la force ennemie dans le cadre du volet pratique du cours axé sur la capture, le transfert et l'interrogatoire. Les stagiaires ont en outre indiqué toutes les blessures (tant mineures que graves) qu'ils ont subies durant le cours. Enfin, six semaines après la fin du cours, les élèves ont répondu à ces mêmes questions, à une exception près : dans la question sur les blessures, on leur demandait cette fois d'indiquer les blessures découvertes après leur retour à la maison, ainsi que les blessures associées à leur participation au cours, qui avaient encore des répercussions négatives sur leur vie et leur capacité d'accomplir leur travail.

Résultats. 1. Les scores pour la santé physique, établis au moyen du questionnaire SF-12, étaient un peu plus faibles après le cours comparativement à ceux obtenus lors de l'évaluation antérieure au cours.

2. Bien que la plupart des élèves aient subi des blessures mineures (p. ex. coupures, éraflures, ecchymoses, douleurs musculaires), seulement trois des 52 participants étudiés ont subi une blessure grave (c.-à-d. fractures, tendons ou ligaments déchirés).

3. La participation au cours SERF n'a eu aucun effet majeur sur le bien-être psychologique des élèves, mesuré au moyen des questionnaires SF-12 ou K-10, immédiatement après la fin du cours ou six semaines plus tard.

4. La plupart des élèves avaient des attentes réalistes quant à la difficulté du cours, même si le cours leur semblait un peu plus difficile immédiatement après la fin du cours que six semaines plus tard.

5. Presque tous les élèves considéraient comme raisonnable le nombre d'attaques physiques de la force ennemie dans le cadre du volet pratique du cours axé sur la capture, le transfert et l'interrogatoire. En fait, la plupart des élèves s'attendaient à un plus grand nombre d'attaques physiques.

Conclusion. En résumé, le cours SERF n'est pas sans présenter un certain risque. Cependant, d'après les auto-évaluations des élèves, la plupart de ces risques étaient négligeables, ayant essentiellement entraîné des blessures mineures, bien que trois blessures graves aient été rapportées. De plus, le cours semble n'avoir eu aucun effet à long terme sur la santé ou le bien-être de ce groupe de participants. Ces derniers semblaient être dûment informés des risques avant de suivre le cours, comme en témoignaient leurs attentes quant à la difficulté du cours SERF auquel ils allaient bientôt participer. Le cours a semblé être conforme à ces attentes, comme l'indiquent les commentaires faits par les stagiaires immédiatement après la fin du cours. De surcroît, ceux-ci ont évalué le cours comme moins exigeant six semaines plus tard.

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Introduction

Physiological Effects of Survival Conditions

Military personnel who find themselves in an emergency situation often must contend with a variety of physiological and psychological threats to their survival. Basic physical needs must be addressed, including thirst, hunger, protection from the elements, and fatigue. For instance, thirst is a particularly significant physiological factor because the body can tolerate water deficits for limited times, and dehydration is accelerated through loss of urine and sweating (Leach, 1994). Food deprivation for periods of up to 3 days is not problematic. Indeed, in the initial stages of a survival situation, people may lose their appetite entirely. However, conditions of starvation and semi-starvation can lead to malnourishment. In these cases, the body will begin to consume its fat stores, muscles, and finally the internal organs, potentially leading to organ failure and death (Leach, 1994).

Protection from the environment also is critical in survival situations. Heat stress has been associated with lethargy & apathy (Baron & Bell, 1976; see also Cheung, McLellan, & Tenaglia, 2000). Heat stroke, however, is a serious medical condition whose symptoms include gross impairment in mental performance, general confusion, headaches, impaired motor co-ordination, delirium, unconsciousness, convulsions, organ failure, and death (Leach, 1994). At the other extreme is cold. The most significant danger associated with cold is death due to hypothermia, during which the person's core body temperature cools to lethal levels (see Tikuisis, 1995; 1997). As the extremities are usually first affected by cold, the ability to conduct fine motor tasks becomes impaired (Brajkovic, Ducharme, & Frim, 2001).

Fatigue, the pervasive weariness associated with mental and physical strain and effort, has been shown to reduce physical efficiency. "Its onset is [often] insidious, its effects rapid, frequently devastating, and it often catches the victim unaware" (Leach, 1994, p. 59). In an emergency or survival situation, sleep disturbances are often also a factor, exacerbated by anxiety, as well as physical discomfort from injuries and environmental conditions. For example, in a five-day, life raft survival study, apathy and behavioral disorganization set in within the first 24 hours, even though the study was conducted under controlled experimental conditions and the volunteer participants were experienced naval personnel (Jensen & Madsen, 1974).

Beyond their individual effects, these factors often operate in synergistic ways in survival situations. For instance, cold disrupts sleep, which further increases fatigue. Similarly, starvation causes body temperature to drop, increasing susceptibility to the effects of cold and greater fatigue. Arctic conditions, especially, have been found to lead to sleep disturbances (Angus, Pearce, Buguet, & Olsen, 1979). Fatigue or sleep loss also can induce a susceptibility to heat stress. Fatigue erodes mental and physical efficiency, and can result in a lack of attention and effort directed at the basics of survival, causing a greater cold, hunger, thirst, lack of good sleep and further fatigue. Thus, separately and together, these factors carry significant concomitant burdens, each feeding off the others and further decreasing the ability to carry out the vital tasks of survival.

Cognitive Effects of Survival Conditions

As summarized by Leach (1994) each of these physical stresses also has implications for cognitive functioning. Severe dehydration upsets the balance of salt and other electrolytes within the body and this can be associated with delusions, visual hallucinations, and irrational behavior. Although, in the short-term, hunger is largely a distraction for survivors, should starvation conditions occur, hunger can become an overriding focus of thoughts and attention, distracting mental focus and causing a substantial decrease in concentration and memory, as well as listlessness. Heat and cold exposure beyond normal ranges can also impact cognitive functioning; for instance, impaired memory and attentional processes can be adversely affected (e.g., Angus, et al., 1979), although the literature has produced some mixed results in this regard. These environmental effects may be particularly significant factors in modern military personnel, who are often required to move rapidly between temperate, arctic, tropical and desert climates (Leach, 1994).

Although people can survive reasonably well for up to 100 hours of sleep deprivation, there are decreases in mental efficiency in terms of response rates and processing time, especially for tasks of at least ten minutes duration (Angus & Heselgrave, 1985; Angus, Pigeau, & Heselgrave, 1992). Under extended sleep deprivation, personality and rational behavior can deteriorate. Mental disorganization can occur, as well as perceptual illusions and hallucinations (minor at first) (Leach, 1994). Tasks that are most affected by sleep loss are those that are dull, routine, repetitive and monotonous (e.g., observational tasks), with higher cognitive functioning (e.g., reasoning and decision making) remaining reasonably intact, at least in the short- to medium-term (Leach, 1994). Even a moderate amount of fatigue can reduce mental efficiency.

Emotional Effects of Survival Conditions

Not surprisingly, the emotional stress associated with survival also can be intense, and derives from a variety of sources, including heightened fears for personal survival, safety and physical discomfort, as well as concern for comrades (Leach, 1994). Moreover, the emotional effects of dehydration and starvation include apathy, depression, irritability, agitation, and restlessness (Leach, 1994). Exposure to extreme, prolonged heat has been associated with lethargy and irritability, while exposure to extremes of and prolonged cold can lead to increased anxiety (Leach, 1994). Extended periods of sleep loss have been associated with experiencing more negative moods (Johnson, 1982), paranoid ideation, and perceived loss of personal control (Leach, 1994). Individuals experiencing intense fatigue show evidence of lethargy and lassitude, and irritability. Anxiety and fear-inducing situations further sap vital mental energies and increase fatigue and contribute to sleep disturbances.

Beyond the physical and psychological impairment associated with survival, these factors also conspire to erode feelings of mastery and hope. Indeed, stress in survival situations is often exacerbated by a profound loss of a sense of control where personnel are "… taken out of a predictable environment and faced with uncertainty [and] fear …" (Laberg, Eid, Johnsen,

Eriksen, and Zachariassen, 2000, p. 334). Indeed, the need for control is so great in humans that stress can trigger a variety of behaviors specifically designed to restore a sense of control, including even magical thinking, superstitious rituals, and behaviors that are counterproductive to survival (Keinan, 2002; see also Leach, 1994).

Capture by Enemy Forces

Capture by hostile forces occurs for approximately 8 to 10% of military personnel engaged in either combat or operations other than war (Flach & Ziljmans, 1997; Mehlum, 1995). Personnel in high-risk occupations, such as aircrew, are particularly vulnerable in this regard.[1] If aircrew are shot down or crash behind enemy lines, additional issues beyond basic survival emerge. These include concerns about torture and about divulging sensitive strategic and tactical information. Indeed, even the fear of capture, rather than capture itself, is thought to reduce operational effectiveness (Walker-Smith & Feggetter, 2001).

Military Survival Training

In response to these potentially critical stressors and their consequences, many military forces have developed survival courses. These courses are designed to prepare their personnel, in particular those in high-risk occupations, for the possibility of survival situations, as well as capture, internment, and interrogation by the enemy. Indeed, many militaries assume this responsibility as part of their duty of care (Walker-Smith & Feggetter, 2001).

Training carries with it a certain level of technical expertise, providing personnel with a potentially vital advantage during a survival situation. People trained in survival techniques are more effective in survival situations (Glass, 1959; Cohen, 1988). Practical training helps the person respond at a more automatic level, ameliorating the negative effects of stress and panic on decision making skills (Leach, 1994). Moreover, in a group situation, inexperienced people will usually look to those with training for practical guidance, but also for clues as to how to respond emotionally. People with survival training experience will usually be quite purposeful in their activities, exuding a sense of calm and focus that is transmitted to people who do not have this training (Leach, 1994). Moreover, this technical expertise is often the basis of leadership in survival situations. Early on in survival situations, those individuals with practical training and experience will develop the overall survival plan, including schedules, often distributing materials (e.g., rations of food and water) and the workload in order to survive (Leach, 1994).

Survival training is usually addressed through a combination of lectures and practical training exercises. The specific level of training that military personnel receive is dependent upon the level of risk associated with their occupation. In general then, soldiers in what are considered lower risk occupations receive less intense training focusing on basic survival skills. Personnel in high-risk roles, such as aircrew and Special Forces, will undergo advanced survival training in order to provide them with the knowledge and skills to persevere and

[1] However, events in Iraq serve as a reminder that even soldiers in what can be considered to be less risky occupation, may also be vulnerable to capture.

prevail in evasion, capture, resistance, and escape situations. The intent of basic and advanced training is to provide students with an opportunity to learn, rehearse, and succeed in mastering the skills that will aid them in survival until rescue. Given the intensity of certain levels of this training, it is particularly important that students are monitored by instructors and training supervisors.

The Advanced Survival, Evasion, Resistance, and Escape (ASERE) course of the Canadian Forces School of Survival and Aeromedical Training (CFSSAT)

The Canadian Air Force response to the requirement for intensive survival skills training is the Advanced Survival, Evasion, Resistance, and Escape (ASERE) course, taught by the Canadian Forces School of Survival and Aeromedical Training (CFSSAT), 17 Wing, Winnipeg. Run several times a year, ASERE is a required course for many Canadian Forces (CF) aircrew. Its goal is to teach a wide variety of survival skills in case aircrew should crash behind enemy lines. Because of the demanding nature of the course, all students are required to have a medical clearance before taking the course. The ASERE course is described to both Medical Officers and students in the following manner:

> "The Advanced SERE (Survival, Evasion, Resistance and Escape) course is very physically and mentally demanding. It is intended to train aviators in procedures required if shot down behind enemy lines. Part of the program requires the students to evade capture for 36 hours over uneven ground while carrying a 40 lb. rucksack. During this time they do not have access to food, and the individual may not be able to take medications as prescribed. Also, individuals are subjected to Tactical Questioning. It is important to ensure that each student is physically and mentally fit prior to the course to prevent aggravation of coexisting medical problems. In assessing the student's fitness, please pay particular attention to ankle, knee, back, cardiovascular system, and any conditions made worse by dehydration and fatigue. Also, ensure that there are no significant mental health stressors or psychological issues. Please also ensure that any patient allergic to bee stings be issued an anakit during summer months."

However, even though the students are cautioned about the demanding nature of the course, and are cleared for participation by their Medical Officer, injuries may occur. Serious injuries, such as broken bones and torn ligaments, may also occasionally occur. While serious injuries may be tracked through the CF medical system, the nature, duration (e.g., short- versus longer-term), and types of general injuries sustained on the ASERE course have not been assessed formally. Similarly, the incidence of psychological distress resulting from the ASERE course has not been systematically assessed.

The Current Research

In January 2004, the 1st Canadian Air Division Surgeon requested that the Stress and Coping Group at DRDC Toronto examine and evaluate the impact of the ASERE course on the short-

and longer-term health and well-being of the students. The tasking request can be found in Annex 1.

In order to address this request, we asked ASERE students a series of questions designed to assess their expectations and perceptions of specific aspects of the course, health and well-being associated with the ASERE course. Moreover, we assessed these factors at three points in time: during the in-clearance process immediately prior to leaving for the training site, immediately after their return from the training site, and six weeks after completing the course (via a mailed out, follow-up questionnaire).

Health & Well-being

Given the specific physical and mental demands of the ASERE course, we asked students about their perceptions of their health and well-being at three time points. The pre-course assessment served as a baseline measure of their health and well-being, with the post-course assessment designed to assess the immediate physical and psychological impact of the ASERE course. We also were interested in those health and well-being symptoms that might be of longer duration or that had emerged as a result of the course. Thus, we also administered a six-week follow-up survey. Health and well-being were assessed using commonly used and validated questionnaires, as well as with an injury self-report question.

Expectations and Perceptions

Dynamic and situation-specific, expectations assess perceptions of future experiences, while perceptions reflect current assessments (Thompson & Gignac, 2001). Expectations and perceptions that are key to the ASERE course concern whether the event is interpreted as a potential for threat, harm, loss, versus as a challenge, and whether people perceive that they have sufficient coping resources, including adequate knowledge and the requisite skills to succeed (Bandura, 1977, 1982; Lazarus & Folkman, 1984).

Indeed, the psychological literature has demonstrated that expectations and perceptions are directly linked to the intensity of people's stress reactions and coping efforts (Catanzero & Mearns, 1999). Negative expectations and perceptions are associated with decreased positive affect and with less adaptive coping efforts than are positive expectations and perceptions (e.g., Kassel, Jackson & Unrod, 2000; Pierce & Lydon, 1998). However, people with overly positive or idealized expectations also may report psychological distress when the 'realities' of situations they experience become evident (Pancer, Hunsberger, Pratt, & Alisat, 2000; Thompson & Holmes, 1996). The survival literature, in particular, concludes that people … "with a knowledge of what to expect in a survival situation will show a higher degree of effectiveness should such a situation arise" (Leach, 1994, p. 123-124).

In order to determine this impact in the present study, we assessed student expectations immediately before they began the course, and their perceptions immediately after completing the course and six weeks after the end of the course. More specifically, we compared students' pre-course expectations of the physical and mental demands with their perceptions of these factors immediately after completing the course. Students who may have been

expecting a less demanding course than they received may not have been adequately prepared for the course, which may in turn leave them vulnerable to health and well-being issues.

Perceptions of Safety during Capture, Transfer and Tactical Questioning

As noted earlier, the ASERE course has more intense components, including evasion, capture and tactical questioning exercises. Thus, we also asked about students' perceptions of their safety, and the degree of force used by the "enemy" force during the capture, transfer, and tactical questioning stages of the practical component of the ASERE course.

Methods

Participants

Students from three consecutive ASERE courses, conducted in 2004, participated in this survey. A total of 52 of the total course load of 60 students (or 87% response rate) volunteered to participate in the initial stage of the research, while 51 students (85% response rate) completed the end-of-course survey, and 25 students completed the six-week follow-up survey (or a response rate of 48%). We were concerned with protecting the students' anonymity in such a small CF community. After discussions with the ASERE training staff, we decided collect demographic information on only two variables: number of years of service in the CF and aircraft platform (Transport and Non-transport). This information indicated that the ASERE students had served between 3 and 28 years in the CF at the time of the survey, with an average time in of 14 years. Most of the ASERE students were in Non-transport occupations (65%).

Procedure

After receiving the tasking request from 1 Canadian Air Division Surgeon (see Annex 1), the two authors met with the ASERE instructors in order to determine the best way to assess the health and well-being of the ASERE students, as well as the types of questions to be asked of them and the best wording of those questions.

Accordingly, it was decided that a three-part survey would best meet the needs to the tasking. Each student would complete a baseline survey before leaving the CFSSAT training building at 17 Wing, CFB Winnipeg for the ASERE training site. The students then would complete a post-course survey immediately after returning to the CFSSAT school from the ASERE training site, prior to release from the course. Finally, a follow-up survey would be sent to students six weeks after the end of the ASERE course in order to determine if there were any ASERE course-related health or well-being concerns that emerged after the course ended, or if any injuries sustained on the course had a continuing and significant negative impact on the students' lives and work.

The students were met either by the first author, or by a research assistant, in a CFSSAT classroom before leaving 17 Wing in Winnipeg for the ASERE training site. The goals of the study were explained to the students (both verbally and via an information sheet; see Annex 2) and they were asked to volunteer their participation. An informed consent sheet (see Annex 3) was then signed and their six-week contact information was gathered on a separate sheet of paper. These contact addresses were destroyed at the end of the study. The questionnaires were then distributed in the classroom to the volunteers, who were asked to complete the questionnaire individually.

The students were met in a CFSSAT classroom at the end of the ASERE course by the same person who introduced the study to them five days previously. The goals of the study were reiterated and the students were asked to complete the end-of-course survey. At both

meetings, questions were encouraged and the option of terminating participation at any time was reiterated.

Finally, students who had provided a mailing address were sent the follow-up questionnaire by mail, six weeks after the course ended. In the package was a letter reminding them of the goals and the voluntary nature of the study. A pre-stamped return envelope also was included.

Because this was a longitudinal study, it was imperative that we be able to link students' responses to all three surveys. However, we also felt it was important to provide students with complete anonymity in order to facilitate full disclosure of course-related health concerns and expectations/perceptions. In order to provide students with a confidential reporting system, no names were used on any of the questionnaires. However, to allow us to link responses across surveys, we used a four-question Personal Identification (PIN) system. These four questions were created to give us enough information to link respondents across surveys, but would not allow us to be able to identify people by name. These four PIN questions were:

1. What are the first three letters of your mother's maiden name?
2. What colour are your eyes?
3. What day of the month were you born (01 to 31)?
4. What are the first three letters of the city or town in which you graduated from High School?

Questionnaires

Each of the three surveys assessed the students' general health and psychological well-being, as well as how strenuous they anticipated the course would be (assessed during the pre-course survey) and their perceptions of how strenuous the course actually was (assessed on the end-of-course and follow-up surveys). Since all students had to have received medical clearance before participating in the course, it was assumed that all students were healthy and not injured at the beginning of the ASERE course. Injuries obtained on the course were assessed in the end-of-course and follow-up surveys using a self-report format. Details of each of the surveys are given below.

Pre-course Survey

Health and Well-being. Two commonly used and validated, self-report measures of health and well-being were used. The first measure was the **SF-12 Health Survey** (Ware, Kosinski, & Keller, 1998; see Annex 4). Each item on the questionnaire is weighted and contributes independently to both of the two SF-12 summary scores: the *Physical Health Component Summary* (PCS) and the *Mental Health Component Summary* (MCS). Both the PCS and the MCS are interpreted using a population mean of 50 and a standard deviation of 10. Thus, scores less than 50 are indicative of poorer than average health, while scores above 50 are indicative of better than average health. The second measure was the **K-10**, which is a 10-item survey that assesses psychological distress (Kessler et al., 2002; see Annexe 5). The items on the K-10 are rated on a 0-4 interval scale. To score the K-10, all items are summed. Higher scores are indicative of greater levels of psychological distress.

Course Expectations. In order to assess their expectations for the course, we also asked the students to answer the following four questions:

(1) *How physically demanding do you think the course will be?* (6-point response scale: Not At All Demanding - Extremely Demanding)

(2) *How mentally demanding do you think the course will be?* (6-point response scale: Not At All Demanding - Extremely Demanding)

(3) *How physically fit do you think you will have to be to complete this course?* (6-point response scale: Not At All Fit - Extremely Fit)

and

(4) *How apprehensive are you about being physically injured while you are on this course?* (6-point response scale: Not At All Apprehensive - Extremely Apprehensive)

End-of-Course Survey

Health and Well-being. Both the SF-12 and the K-10 were given to students at the end of the ASERE course.

Injuries. Students were presented with a four-sided representation of a human (front, back, right side, left side; see Figure 1). They were given the following instructions: "Please indicate any injuries that were a direct result of the ASERE course. The injuries could be as minor as a cut or bruise. Indicate the position of the injuries on the figures above using numbers (e.g. 1-7) and then briefly describe the injury, its severity, and how it was obtained below, after the corresponding numbers." A table was also provided for them to describe their injuries.

Discussion with an Aircrew Medical Officer at DRDC Toronto subsequently provided us with a coding scheme that enabled us to categorize the injuries that the students reported. Thus, each injury was coded as **Minor** (e.g., minor cuts, scrapes, bruises, mosquito and other bug bites) or **Major** (e.g., broken bones, cuts requiring stitches, other injuries requiring medical attention) according to this coding scheme.

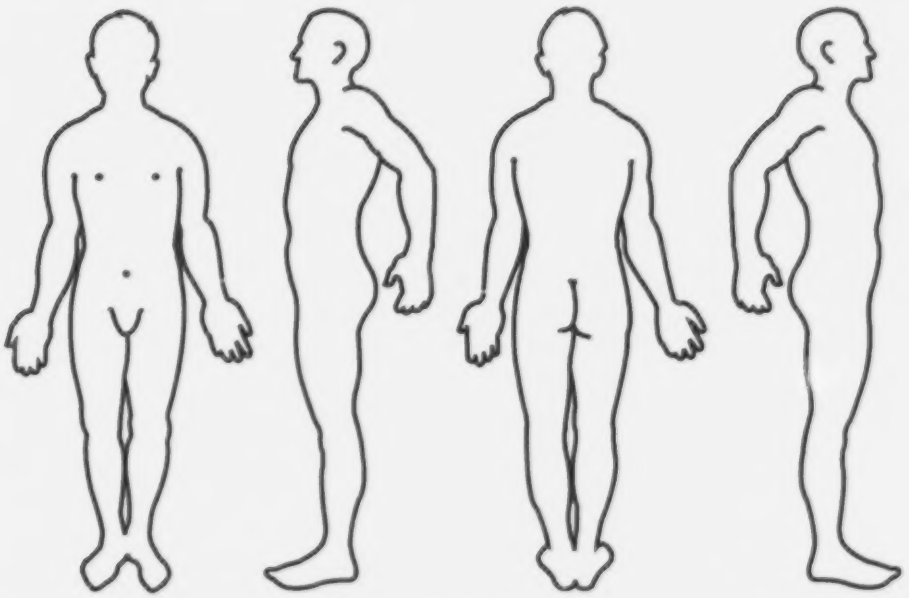

Figure 1: Injury rating figures used by ASERE students to report injuries sustained during the course.

Justification of Initial Course Expectations. To determine whether students' initial course expectations were justified, three of the four questions asked in the Pre-course survey were reframed and asked again here:

(1) *How physically demanding do you think the course was?* (6-point scale: Not At All Demanding - Extremely Demanding)

(2) *How mentally demanding do you think the course was?* (6-point scale: Not At All Demanding - Extremely Demanding)

and

(3) *How physically fit do you think students should be in order to complete this course?* (6-point scale: Not At All Fit - Extremely Fit)

Two other questions also were asked to assess this issue:

(1) *Were your initial expectations for the course justified* (Yes/No);

and

(2) *Was the course easier or tougher than you thought it would be?* (6-point scale: A Lot Easier - A Lot Tougher)

Perceived Safety Concerns While on the Course. In order to ascertain how students perceived their safety at the hands of the enemy force, we asked three questions in two separate ways: whether the level of force or contact used by the enemy force was less or more than expected, and whether they felt that more or less contact was needed. More specifically, the questions were as follows:

(1a) *How was the level of physical contact used by the enemy force during the capture phase, compared to what you expected?* (7-point scale: A Lot Less than Expected - Exactly as Expected to A Lot More than Expected)

(1b) *Do you think the enemy force used an appropriate amount of physical contact during the capture phase, or does there need to be more or less physical contact at that point?* (7-point response scale: A Lot Less Contact is Needed - Amount of Contact Exactly as Needed - A Lot More Contact is Needed)

(2a) *How was the level of physical contact used by the enemy force during the transfer phase, compared to what you expected?* (7-point response scale: A Lot Less than Expected - Exactly as Expected to A Lot More than Expected)

(2b) *Do you think the enemy force used an appropriate amount of physical contact during the transfer phase, or does there need to be more or less physical contact at that point?* (7-point response scale: A Lot Less Contact is Needed - Amount of Contact Exactly as Needed - A Lot More Contact is Needed)

(3a) *How was the level of physical contact used by the enemy force during the tactical questioning phase, compared to what you expected?* (7-point response scale: A Lot Less than Expected - Exactly as Expected - A Lot More than Expected)

and

(3b) *Do you think the enemy force used an appropriate amount of physical contact during the tactical questioning phase, or does there need to be more or less physical contact at that point?* (7-point response scale: A Lot Less Contact is Needed - Amount of Contact Exactly as Needed - A Lot More Contact is Needed)

Six-week Follow-up Survey

Because students may not have had time to fully evaluate how they felt immediately after completing a difficult and exhausting five-day course, we also administered a six-week follow-up survey. This gave the students a chance to go home and have time to reflect upon the ASERE course. It also allowed for the assessment of injuries that were continuing to bother students, and for the assessment of injuries that emerged during those six weeks that students felt were the result of the course. The six week follow-up survey also allowed for the assessment of any student attitudes and evaluations shift during this time period.

Accordingly, the follow-up survey was almost identical to the end-of-course survey, save for one change. The injury rating instructions were re-worded to focus on whether any ASERE course-related injuries surfaced after the students returned home, and whether any injuries

they sustained during the course were still affecting them. The instructions read as follows: "Please indicate any injuries that were a direct result of the ASERE course that either were not apparent at the end of the course or continue to affect you. Indicate the position of the injuries on the figures above using numbers (1-7) and then briefly describe the injury and how it affected your job performance or day-to-day living, after the corresponding numbers."

Results

Attrition

Response rates for the pre-course and post-course surveys were very high (87% and 85%, respectively), while 48% of students completed the final, six-week follow-up portion of the study. Because of this, an attrition analysis was conducted in order to determine whether there were any significant differences between those who did, versus those who did not, return the follow-up survey. This analysis was conducted on the following variables: demographics (years in the CF, airframe type), health and well-being scores (both pre- and post-course), and course expectations and experiences (both pre- and post-course).

A series of t-tests and chi-square analyses were performed, with Follow-up Return (Yes/No) as the independent variable, and demographics, health and well-being scores, and course expectations and experiences as the dependent variables.[2] None of the tests were statistically significant. Thus, there were no significant differences between those students who did, versus those who did not, return the follow-up survey, on any of the dependent variables.

Health

Health was measured by two outcomes: the Physical Health Component Summary (PCS) of the SF-12 (a comparison between both pre- and post-course scores, as well as a comparison across all three administrations of the scale) and the number and type of injuries sustained on the course (as reported both post-course and at the six-week follow-up).

Table 1: ***Means and standard deviations for the SF-12 Physical Health Components Scale, pre-course, post-course, and at the six-week follow-up. A mean of 50 is the population norm.***

	N	Mean	Std. Deviation
SF-12 Physical Components Scale, Pre-test	52	49.5438	5.26041
SF-12 Physical Components Scale, Post-test	50	46.4393	8.66452
SF-12 Physical Components Scale, Follow-up	25	47.7428	7.29153

SF-12 PCS Scores. Table 1 shows the means and standard deviations for the three PCS scores. As Table 1 shows, the baseline physical health score approximates the average score found in a normal, healthy population (Ware et al., 1998). However, there was a three-point

[2] Because of the large number of statistical tests, there is an increased probability of finding a significant difference by chance alone. To control for this, a Bonferroni correction was applied to the minimum acceptable probability value of the statistical tests being conducted (i.e., .05/24 analyses = .002). Thus, a minimum *p*-value of .002 is required for any differences in these attrition analyses to be considered statistically significant.

drop in students self-reported physical health scores immediately following the ASERE course, followed by a slight increase at the six-week follow-up point.

To test whether these changes were statistically meaningful, two repeated measures analyses of variance (ANOVAs) were conducted.[3] First, a repeated measures ANOVA comparing the pre- and post-course physical health scores showed that the post-course drop was statistically significant, $F(1,49) = 6.43$, $p < .01$ ($\eta^2 = .14$). However, it should be noted that the drop was within one standard deviation of the average baseline PCS score, and accounted for only 14% of the variability in the change in physical health scores (i.e., the size of the effect was small, in practical terms). Thus, while statistically significant, the practical significance of this result is likely not great.

A second ANOVA compared all three PCS means. Results here revealed that the changes in students physical health self-reports across pre-, post- and follow-up surveys were not statistically significant ($p < .365$).

Injuries. The second method of assessing the health impact of the ASERE course was to explore the number and type of injuries that occurred during the course, as well as whether the impact of those injuries extended beyond the course.

At the end of the course, 86% of the students reported at least one injury. However, most of those injuries were minor. The most common minor injuries were bruises (44%), cuts (38%), scrapes (25%), sore muscles/sore back (23%), blisters (13%), sore feet (13%), water immersion discomfort (13%), self-diagnosed muscle sprains (12%), sore knees (11%), and chafing (8%).

Only 3 (6%) students sustained a major injury. Of the three people suffering a major injury, two sustained broken bones, two reported tendon or ligament damage, and one person reported a chipped bone.

At the six-week follow-up, students were asked if there were any injuries that they did not notice at the end of the course, or if there were injuries that arose after returning home, but which they attributed to the ASERE course. Finally, students were asked if any of the injuries they sustained were still having a negative impact on their health or their ability to do their job.

Just less than half of the students (48%) reported existing or new injuries, all of which were minor. The most common ailments were numb toes or feet (16%), sore knees (12%), sore muscles/sore back (8%), and bruises (8%). Two of the three students who reported a major

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[3] The comparison across the three time periods included only those cases where the follow-up PCS scores were available, thus the sample size for the analysis dropped from 50 to 25 respondents. This lower sample size would have a negative impact on the ANOVA's ability to detect significant differences. This is referred to as a reduction in power. Thus, we adopted a two-step approach to these analyses: a repeated measures ANOVA comparing the pre- and post-course PCS scores (N = 50) and a repeated measures ANOVA comparing all three means (N = 25).

injury during the course were still experiencing problems, and one of those two people reported that the end of their course-related health problems was "still a long ways away".

Psychological Well-being

Psychological well-being was measured by two outcomes: the Mental Health Component Summary (MCS) from the SF-12 (Ware et al., 1998) and the K-10 measure of psychological distress (Kessler et al., 2002). ANOVAs were again conducted to determine whether students' SF-12 or K-10 scores varied across the course[4].

Table 2 displays the means and standard deviations in mental health (MCS) scores across the three testing periods, while Table 3 shows the means and standard deviations in K-10 scores. None of the repeated measure ANOVAs were significant (all p-values > .10). Thus, the psychological well-being of the students was not adversely affected by their participation in the ASERE course.

Table 2: ***Means and standard deviations for the SF-12 Mental Health Components Scale, pre-course, post-course, and at the six-week follow-up. A mean of 50 is the population norm.***

	N	Mean	Std. Deviation
SF-12 Mental Components Scale, Pre-test	52	49.0005	4.02897
SF-12 Mental Components Scale, Post-test	50	50.2340	5.94317
SF-12 Mental Components Scale, Follow-up	25	50.3944	4.19650

Table 3: ***Means and standard deviations for the K-10 Distress Scale, pre-course, post-course, and at the six-week follow-up.***

	N	Mean	Std. Deviation
K-6 Psychological Distress Score, Pre-test	52	1.5769	1.48649
K-6 Psychological Distress Score, Post-test	50	1.4400	1.85340
K-6 Psychological Distress Score, Follow-up	25	1.6000	1.77951

Course Expectations and Perceptions

Pre-Course Survey. In the pre-course survey, we asked four questions about students' expectations for the course. Each item was scored on a scale from 0 to 6, where higher scores meant higher expectations. Responses to those questions are shown in Table 4. As these responses show, students had fairly high expectations; the averages for their expectations of how physically and mentally demanding the course was going to be were well above the mid-

[4] The same two-stage statistical testing process used in the analysis of the PCS scores were used to determine whether the differences in MCS and K-10 scores across surveys were statistically significant.

point (mid-point value = 3.00), while their expectation for how physically fit they should be to complete the course was slightly above the mid-point value. Students had relatively little worry about being physically injured on the course.

Table 4: ***Means and standard deviations for the four pre-course questions assessing course expectations. Each question has a range of response from 0 to 6.***

	N	Mean	Std. Deviation
How physically demanding do you think the course will be?	52	4.7115	.93592
How mentally demanding do you think the course will be?	52	4.5000	.82842
How physically fit do you think you will have to be to complete the course?	52	3.7500	.81349
How apprehensive are you about being physically injured while on this course?	52	2.8269	1.65353

Post-Course Survey. At the end of the course, students' perceptions of the level of physical and mental demand, as well perceptions of the physical fitness requirements for the course were re-assessed. In addition, we asked whether they felt the course was easier or tougher than they expected it to be. For this latter question, responses ranged from 0 (A Lot Easier Than Expected) to 6 (A Lot Tougher Than Expected), with 3 (As Expected) being a neutral response.

As Table 5 shows, immediately after completing the course, students continued to rate the course as physically and mentally demanding, and requiring the students to be physically fit. When we asked whether the course was easier or tougher than they expected, 12% felt it was easier than they expected, 33% felt it was exactly as they expected, and 55% felt it was tougher than they expected. When asked whether their initial expectations concerning the course were met, 94% answered "Yes."

Table 5: ***Means and standard deviations for four questions assessing perceptions of the course, asked at the end of the course. Each question has a range of response from 0 to 6.***

	N	Mean	Std. Deviation
How physically demanding do you think the course was?	51	5.0392	.87088
How mentally demanding do you think the course was?	51	4.4706	1.10187
How physically fit do you think students should be in order to complete this course?	51	4.1176	.73884
Was the course easier or tougher than you thought it would be?	51	3.7255	1.21784

Six-Week Follow-Up. We asked the same questions in the six-week follow-up. As Table 6 indicates, students continued to feel that the course was physically and mentally demanding, requiring the students to be physically fit, as evidenced by mean scores that were above the mid-point of 3. However students' average responses to the demand and fitness questions at

the six-week follow-up were lower than those that they reported immediately following the course.

Responses to the question about whether the course was easier or tougher than they expected also were somewhat different than was the case immediately after the course completion, with 24% feeling it was easier than they expected, 36% feeling it was exactly as they expected, and 40% feeling it was tougher than they expected. When asked whether their initial expectations for the course were met, 92% answered "Yes" at the follow-up.

Table 6: ***Means and standard deviations for four questions assessing perceptions of the course, asked six-weeks after the course concluded. Each question has a range of response from 0 to 6.***

	N	Mean	Std. Deviation
How physically demanding do you think the course was?	25	4.24	1.300
How mentally demanding do you think the course was?	25	3.60	1.258
How physically fit do you think students should be in order to complete this course?	25	3.68	1.069
Was the course easier or tougher than you thought it would be?	25	3.24	1.200

Assessing Changes in Expectations and Perceptions. To determine whether these differences in student expectations and perceptions across the three assessment points (i.e., pre-course, post-course, six-week follow-up) were statistically meaningful[5], we adopted a three-stage process. First, we wanted to determine whether the students' increased perceptions of the mental and physical toughness, as well as physical fitness requirements, from pre-course to post-course were statistically significant. To do this, we computed a paired-sample t-test (pre-course vs. post-course) for each of these three questions.

Results indicated that students believed the course to be significantly more physically demanding immediately after completing the course, as compared to their expectation just before taking the course (Means = 4.71 vs. 5.04, respectively; $t(50) = -2.48$, $p < .05$). However, students expectations of the mental demand of the course did not significantly differ from pre-course to post-course immediately upon their return from the training area (Means = 4.50 vs. 4.47, respectively, $t(50) = 0.28$, $p > .05$). Lastly, students' perceptions of how physically fit students who take the course should be did significantly increase between their pre-course and immediate post-course assessments (Means = 3.75 vs. 4.12, respectively; $t(50) = -2.83$, $p < .05$).

In the second stage of these analyses, we asked whether the decreases in students' perceptions of course difficulty from the post-course to the six-week follow-up were statistically meaningful. Again, we computed a series of paired-sample t-tests for the same three questions. However, because we were comparing post-course to the follow-up, these analyses include only those 25 people who returned the follow-up questionnaire. Thus, the means used in these analyses may be slightly different than those in Tables 5 and 6.

[5] as opposed to reflecting random variability in responses

Results of these analyses revealed that students' perceptions of how physically demanding the course was significant decreased between the post-course and the six-week follow-up questionnaires (Means = 5.00 vs. 4.24, respectively, $t(24) = 2.92$, $p < .05$). Students' perceptions of the mental demand of the course also significantly decreased in the six-weeks between the post-course and the follow-up surveys (Means = 4.36 vs. 3.60, respectively; $t(24) = 3.08$, $p < .05$). Similarly, students' perceptions of the physically fitness requirements of the course also significantly decreased between administrations of the post-course versus follow-up questionnaires (Means = 4.16 vs. 3.68, respectively, $t(24) = 2.61$, $p < .05$).

We also asked whether there were significant differences between the post-course and the follow-up in terms of students' perceptions of how easy versus how tough was the course. Again, we used a paired-sample t-test and only those students who returned the follow-up survey are represented in these findings. The t-test showed students perceived the course to be significantly less tough at the six-week follow-up than they had immediately after completing the course (Means = 3.96 vs. 3.24, respectively, $t(24) = 2.75$, $p < .05$).

Finally, we wanted to know whether the expectations students had for the level of course difficulty returned to the pre-course, or baseline values at the six week follow-up. As in the last two sets of analyses, we used a paired-samples t-test, comparing the means for the pre-course expectations with the means for the six-week follow-up. Results of these analyses indicated that students rated the course as significantly less physically demanding six weeks after the course than they had expected prior to taking the course (Means = 4.24 vs. 4.88, respectively), $t(24) = 2.14$, $p < .05$. Student' perceptions of the mental demands of the course also were significantly lower at the follow-up than they were the pre-course assessment (Means = 3.60 vs. 4.68, $t(24) = 4.55$, $p < .05$).

Perceived Safety Concerns While on the Course

In the post-course and follow-up surveys, we asked students about their perceptions of the their safety during the course. First, we asked about the level of physical contact used by the enemy force during the capture, the transfer, and the tactical questioning phases. Responses to each of these questions were made on a scale from –3 (A Lot Less Than Expected) to +3 (A Lot More Than Expected), with "Exactly As Expected" being represented by a zero. We also asked the students whether they felt the level of contact used by the enemy force was more, less, or exactly as needed during each of the three phases. As with the previous questions, responses to each of these questions were made on a scale from –3 (A Lot Less Contact is Needed) to +3 (A Lot More Contact is Needed), with "Exactly As Needed" being represented by a zero.

Post-Course. Post-course responses to the three questions about physical contact during the capture, transfer, and tactical questioning phases are shown in Table 7. Interestingly, sixty-six percent of the students expected more physical contact from the enemy force than they received during the capture phase, while 50% expected more physical contact than they received during the transfer phase, and 69% expected more physical contact than they received during the tactical questioning phase.

Table 7: ***Means and standard deviations for three questions from the post-course survey assessing perceptions of level of contact used by the enemy force during the capture, transfer, and tactical questioning phases of the ASERE course. Each question has a range of response from -3 (A Lot Less Than Expected) to +3 (A Lot More Than Expected).***

	N	Mean	Std. Deviation
How was the level of physical contact used by the enemy force during the capture phase, compared to what you expected?	50	-1.0600	1.25210
How was the level of physical contact used by the enemy force during the transfer phase, compared to what you expected?	50	-.7400	1.06541
How was the level of physical contact used by the enemy force during the tactical questioning phase, compared to what you expected?	48	-1.1667	1.22619

When asked to indicate the degree to which they felt more or less physical contact is needed at each of these three phases of the course, many students felt that more contact was needed. Average responses are shown in Table 8. In general, for the capture phase, no one thought the enemy force needed to use less contact; 28% thought the amount of contact used was exactly as needed, while 72% felt that more contact was needed. During the transfer phase, 35% felt the amount of contact used was exactly as needed, while 65% felt more contact was needed. During the tactical questioning phase, 4% felt that less contact was required, 12.5% felt that the amount of contact was exactly as needed, while 83.5% felt that more contact was needed.

Table 8: ***Means and standard deviations for three questions from the post-course survey assessing perceptions of necessary contact required by the enemy force during the capture, transfer, and tactical questioning phases of the ASERE course. Each question has a range of response from –3 (A Lot Less Contact is Needed) to +3 (A Lot More Contact is Needed).***

	N	Mean	Std. Deviation
Do you think the enemy force used an appropriate amount of physical contact during the capture phase, or does there need to be more or less physical contact at that point?	50	1.0800	.87691
Do you think the enemy force used an appropriate amount of physical contact during the transfer phase, or does there need to be more or less physical contact at this point?	49	.9388	.87579
Do you think the enemy force used an appropriate amount of physical contact during the tactical questioning phase, or does there need to be more or less physical contact at that point?	48	1.1250	.91384

Six-Week Follow-Up. Responses to the three questions about physical contact during the capture, transfer, and tactical questioning phases provided by students six weeks after completing the course are shown in Table 9. Seventy-six percent of the students expected more physical contact from the enemy force than they received during the capture phase,

while 60% expected more physical contact than they received during the transfer phase, and 64% expected more physical contact than they received during the tactical questioning phase.

Table 9: ***Means and standard deviations for three questions from the follow-up survey assessing perceptions of level of contact used by the enemy force during the capture, transfer, and tactical questioning phases of the ASERE course. Each question has a range of response from -3 (A Lot Less Than Expected) to +3 (A Lot More Than Expected).***

	N	Mean	Std. Deviation
How was the level of physical contact used by the enemy force during the capture phase, compared to what you expected?	25	-1.04	.889
How was the level of physical contact used by the enemy force during the transfer phase, compared to what you expected?	25	-.84	1.028
How was the level of physical contact used by the enemy force during the tactical questioning phase, compared to what you expected?	25	-1.08	1.187

When asked at follow-up to indicate the degree to which they felt more or less physical contact is needed at each of these three phases of the course, many students felt that more contact was needed. Average responses are shown in Table 10. In general, for the capture phase, no one thought the enemy force needed to use less contact; 28% thought the amount of contact used was exactly as needed, while 72% felt that more contact was needed. During the transfer phase, 4% felt that less contact was needed, 36% felt the amount of contact used was exactly as needed, while 60% felt more contact was needed. During the tactical questioning phase, 4% felt that less contact was required, 40% felt that the amount of contact was exactly as needed, while 56% felt that more contact was needed.

Table 10: ***Means and standard deviations for three questions from the follow-up survey assessing perceptions of necessary contact required by the enemy force during the capture, transfer, and tactical questioning phases of the ASERE course. Each question has a range of response from –3 (A Lot Less Contact is Needed) to +3 (A Lot More Contact is Needed).***

	N	Mean	Std. Deviation
Do you think the enemy force used an appropriate amount of physical contact during the capture phase, or does there need to be more or less physical contact at that point?	25	1.08	.909
Do you think the enemy force used an appropriate amount of physical contact during the transfer phase, or does there need to be more or less physical contact at this point?	25	.96	1.020
Do you think the enemy force used an appropriate amount of physical contact during the tactical questioning phase, or does there need to be more or less physical contact at that point?	25	.80	.957

Assessing Changes in Perceptions of Physical Contact from Post-Course to Follow-Up. Did students' average perceptions of the amount and necessity of the physical contact used by the enemy force during the capture, transfer, and tactical questioning stages change from the end of the course to the follow-up survey? A series of paired-sample t-tests compared the average responses to each of the three questions about their expectations of force and the three questions about the necessary level of that force. There were no significant changes in those perceptions across time.

Correlations Between Pre-Course Expectations, and Health and Well-being. Because expectations for how difficult the ASERE course may be are an indication of the level of anxiety people are experiencing about the course, and because that anxiety may put people at an increased risk for adverse health outcomes (both physical health and psychological well-being), we examined the correlations between pre-course expectations and both pre-course and post-course health outcomes. There was a significant, moderate correlation between pre-course psychological distress scores (measured with the K-10) and concerns about being physically injured while on the course, $r(50) = .40$, $p < .05$. That is, those students with greater concerns about being injured had higher levels of distress prior to taking the course. There was a similar trend with the SF-12 Mental Health Component Score score: more concern about injury was associated with poorer levels of general psychological well-being prior to taking the course, $r(50) = -.27$, $p < .06$.

Next, we explored correlations between pre-course expectations and post-course health and well-being (SF-12 Physical Health Component Score, SF-12 Mental Health Component Score, K-10 Psychological Distress Score, the total number of injuries, and the total number of minor injuries). None of the correlations were significant, suggesting that pre-course expectations were not associated with health concerns immediately after completing the course.

Finally, we explored associations between the pre-course expectations and the six week follow-up health and well-being indices. Two significant correlations emerged. First, the more physically demanding the students expected the ASERE course to be (at the pre-course session), the lower their SF-12 Physical Health Component scores were at follow-up, $r(23) = -.53$, $p < .05$. Secondly, the more physically fit the students expected they had to be to take the ASERE course (at the pre-course session), the lower their SF-12 Physical Health Component scores were at follow-up, $r(23) = -.47$, $p < .05$.

Summary and Conclusions

We assessed the self-reports of health and well-being of 52 students in three consecutive ASERE courses. A three-phase assessment procedure was used, with students completing questionnaires immediately pre- and post-course, as well as six weeks after the end of the course. In addition to examining students' self-reports of health and well-being, we also assessed students' expectations and perceptions of the course. We focused on their expectations of how physically and mentally demanding the course would be, as well as their expectations of how physically fit ASERE students should be.

Immediately after completing the course we asked students about their perceptions of how physically and mentally demanding the course was. This was done because if students were expecting a less demanding course than they received, they may not have been adequately prepared for the course, which may in turn be distressing. We assessed students' perceptions of their safety, and their perceptions of the appropriateness of the level of physical contact used by the hunter force during the capture, transfer, and tactical questioning stages of the practical component of the ASERE course.

We were also interested in the longer-term consequences of participation in the ASERE course. In order to pursue this question, we contacted students approximately six weeks after they had completed the course. The follow-up questionnaires again asked students for their self-reported health and well-being, their perceptions about the physical, mental and fitness demands made by the course, as well as their perceptions of their safety during the capture, transfer, and tactical questioning stages of the practical component of the ASERE course. The results of these analyses yielded several findings of potential interest to the 1st Canadian Air Division Surgeon and the CFSSAT ASERE staff.

Self-reported Health and Well-being

First, the ASERE course did not appear to have any appreciable effect on the self-reported physical health or psychological well-being of most of the students. While there was a statistically significant decrease in self-reported physical health scores on the SF-12 measure from pre- to post-course, the magnitude of the effect (or the practical significance of this finding) was small. Similarly, most students reported only minor injuries, for instance, cuts, bruises, and muscle soreness, as a result of the practical component of the course. The most commonly reported minor ailments were numb toes or feet (16%), sore knees (12%), sore muscles/sore back (8%), and bruises (8%). Three students experienced a major injury during the course, including broken or chipped bones and muscle or ligament damage. Two of these three students were still experiencing problems at the follow-up, and one of those two people reported that the end of their course-related health problems was "still a long ways away." Finally, there were no significant changes in psychological well-being across the period of the study, suggesting that the course did not cause any immediate or prolonged psychological distress to the students.

Expectations and Perceptions

With respect to the students' expectation of how demanding the course would be, especially compared to post-course perceptions, several interesting findings emerged. First, all but one student expected the course would be at least moderately physically demanding, and all students expected the course to be at least moderately mentally demanding. Similarly, all but one respondents thought that students would need to be at least moderately physically fit in order to complete the course. These findings indicate that most students are aware of the difficult nature of the course and are expecting to be challenged, both physically and mentally.

Students expected a fairly demanding, intense course, and based upon post-course assessments, the course surpassed these expectations. Immediately after completion, students rated the course as significantly more physically demanding than their initial expectations, with 50% of the students reporting the course was tougher than they had anticipated, although their perceptions of the mental demand of the course remained unchanged. However, those perceptions then changed again at the six-week follow-up. At this time, they remembered the course as significantly less physically and mentally demanding, and requiring less physical fitness than they thought it was immediately after the course ended. Still, even at this point, 40% of students continued to report that the course was tougher than they had expected.

Even more interesting at this follow-up assessment was the fact that the students remembered the course as less physically and mentally demanding than they initially expected it to be. This may be a function of the closeness of the pre-course assessment. That is, it may be that anxiety or apprehension surrounding the ASERE course might have inflated expectations for how physically and mentally demanding the course was going to be. If the pre-course assessment was made six weeks before the course, would the expectations approximate the six-week follow-up perceptions? This type of question only can be answered empirically in a future study.

Perhaps, not surprisingly, pre-course apprehension surrounding the possibility of being injured, was associated with initial levels of psychological distress. However, course expectations were not associated with any of the health and well-being measures immediately following the course. There were some associations between initial expectations and follow-up health measures, though. Physical demand and physical fitness expectations were associated with poorer SF-12 physical health scores at the follow-up. This result may suggest that those students who had more concerns were in less physically fit condition when embarking on the course, and this may account for the higher level of reported injuries post-course. It is important to note that we did not directly assess this relation, and so this explanation of this particular result is speculative at this point.

Level of Physical Contact from the Enemy Force

Another important finding of this study concerns the students' perceptions of the amount of physical contact used by the enemy force during the capture, transfer, and tactical questioning phases of the practical component to the course. Only six to eight percent of the students felt that the physical contact used by the enemy force was greater than they expected, but only one of the 52 students felt that less contact was needed. Thus, the majority of these students

expected the enemy force to use more physical contact during capture, transfer and tactical questioning, and that more physical contact was needed. Of course, requirements concerning the degree of physical contact used to illustrate and underscore teaching points in a course of this nature are the joint decision of the CFSSAT commander, and the training, safety and medical staff. Nonetheless, this finding does suggest that the majority of these students felt that they could have tolerated more physical contact by the enemy force.

Self-Report Data

This study was based upon the self-reports of health, well-being and perceptions of ASERE students. Although self-report data can suffer from a number of biases, including self-presentation (e.g., Adler, Thomas, & Castro, 2005) and concerns about how answers might affect flying status, we designed the present study specifically to minimize the potential influence of these factors. First, we introduced the study personally, and made clear that students understood that we had with no connection to CFSSAT, students' outcomes in the course, or with their chain of command. Second, we worked with CFSSAT staff to limit the number of demographic questions asked of students, so that putting three or more questions together would not serve to identify individual respondents (e.g., we avoided questions that would triangulate in on the only female pilot from a particular home unit). We also developed a procedure that allowed students to create their own unique personal identification code to further ensure that the questionnaire data were completely anonymous.

We also were quite encouraged by the extremely high participation rates in this study, particularly in the pre-course and immediate post-course questionnaires, where participation was 85 and 87 percent, respectively. Although response rates on the follow-up questionnaire dropped to 48 percent, this is neither particularly low nor unexpected in longitudinal research of this kind, which typically involves some level of attrition at each stage of a study. There can be many reasons for the drop in participation, including a lack of motivation. However, it is important to remember that aircrew travel quite often and at least some of these students may have been away again six weeks after the course completion, either on a deployment or on training. Finally, it is very important to note that those students who did not respond to the follow-up questionnaire did not differ in terms of health, well-being or perceptions from those who did complete the follow-up questionnaire. This supports the representativeness of the follow-up sample, and, thus, the validity of the responses reported six weeks after the conclusion of the course.

Future Research

Despite our confidence in the validity of the self-reports obtained from the ASERE students, future research of this nature might benefit from physician assessment of student health, immediately following the course and six weeks later. Another potential measure might come in the form of instructor assessments of student performance. Further longer-term follow-up (e.g., six month or one year follow-up) assessments of students health and well-being might also be revealing. The longer-term follow-ups might be more justified had their been a higher level of physical or psychological distress noted during the six week follow-up. Moreover, it also should be noted that these additional assessments might well affect students' beliefs in the anonymous nature of the data collection, and might thus increase the students' self-

presentation concerns. Thus, any integration of more of these types of more detailed assessments needs to be carefully considered prior to implementation.

The present study assessed students' assessments in three consecutive ASERE courses. Thus, while we have captured a good snapshot of students' experiences, this assessment was conducted only during one season of the year. Therefore, at this point we do not have a complete picture of the impact of seasonal factors, including temperature, weather, and insect and animal life. Future research may wish to conduct assessments across seasons to determine the potential impact of these factors.

Conclusion

In conclusion, the ASERE course is not without some degree of risk. However, the majority of the physical injuries were minor in nature and there were no negative effects on students' self-reported psychological distress. Moreover, students appear to be aware of the demands associated with the course before they embark on it. As well, their perceptions of any aspect of the course do not deteriorate after taking the course, either immediately, or six weeks after the completion of the course.

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Annexe 1: Tasking Memo

National Defence / Défense nationale

DRDC TRANSIT RECORD		
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4 Health Support Operational Training Unit
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1 Canadian Air Division Headquarters
Box 17000 Stn Forces
Winnipeg MB R3J 3Y5

4500-1 (AMP FS)

7 January 2004

Distribution List

PHYSICAL AND PSYCHOLOGICAL SURVEY OF ADVANCED SERE COURSE

References: A. Email Megan Thompson/Major Downes 23 September 2003
B. Draft Student Survey (enclosed)
C. Advanced SERE Course Schedule as of 12 November 2003 (enclosed)
D. Perscon Maj Downes/Maj Power 15 December 2003

1. The Advanced Survival Evasion Resistance and Escape (SERE) Course is very physically and psychologically demanding for the students. The short and long-term health consequences of the program run by the Canadian Forces School of Survival and Aeromedical Training (CFSSAT) have never been evaluated. Thus it is requested that the Experimental Psychological Stress and Coping Group from Defence Research and Development Canada – Toronto (DRDC-T) formally evaluate the impact on the students.

2. Initial discussions have taken place (refs A and B) to determine the type of study to be conducted and the cost estimate. The students will be surveyed three times (start of course, end of course and 6 weeks post course). This office will cover the cost of 3 trips to Winnipeg for one person and DRDC-T will cover the other costs associated with the study. Ref C lists the tentative dates for the upcoming advanced SERE courses but it is recommended that confirmation be made with CFSSAT prior to finalizing travel arrangements.

3. It is requested that DRDC-T conduct this study and provide a report to this office prior to 1 Dec 04. Any questions can be directed to Major Downes, CFSSAT SERE Medical Advisor, at (204) 833-2500 extension 5430.

G.R. Christiansen, MD
Lieutenant Colonel
1 Canadian Air Division Surgeon

Distribution List (page 2)

1/2

Canada

Annexe 2: Information Sheet

Purpose	In January 04, 1 Can Air Div Surg tasked the Stress and Coping Group at Defence R&D Canada--Toronto to assess the short and longer-term health impacts of the ASERE course on students, especially with respect to injuries that could have implications for flying status.
The Present Study	The study involves completing a questionnaire before the course begins, a second questionnaire at the course end, and a final evaluation 6 weeks afterwards. Each questionnaire asks two demographic questions so that we can better describe our group of participants in general terms, some questions about your expectations and appraisals of the course, and two short, standard general health and well-being questionnaires. If you have any questions while completing the evaluation, please do not hesitate to speak with the DRDC representative. Your participation is completely **voluntary**. You may end your participation at any time and your completed questionnaires will be destroyed. You may skip individual questions that you do not wish to answer. The survey should take 10-30 minutes to complete.
Importance of Your Participation	The findings from this evaluation will be presented to the 1 CAD Surg and the CO of CFSSAT. The accuracy and quality of the findings we present is entirely dependent on the openness of our participants. Thus, should you choose to participate, it is important that you answer the questions as honestly as possible.
Guarantee of Anonymity	**Your anonymity is guaranteed**. Your name will not be included anywhere in our data files. Your information will be combined with those from other participants and only group data will be presented. We ask for your name and contact information only to mail you the 6-week follow-up evaluation. This contact information will be kept separate from your data and will be destroyed at the end of the study We will link your three evaluations using an **anonymous PIN** that is generated by your response to four questions that are unique to you and are unrelated to your physical identity.
Guarantee of Confidentiality	**The confidentiality of your responses is guaranteed**. DRDC researchers are guided by, and adhere to, professional and ethical guidelines concerning behavioural research that involves people. Only DRDC-authorized researchers will have access to the information from this evaluation. DRDC is responsible for confidential storage of the data in a secure area.
Benefits	This research will benefit the CF in helping to quantifying the health and well-being outcomes associated with taking the Advanced SERE course.
Risks	Mild eyestrain, fatigue, and boredom and a temporary focus on physical symptoms such as joint pains or headaches are possible short-term risks of completing this questionnaire. If any questions trigger intense or persistent discomfort, you should contact study personnel at the end of the session or contact medical personnel at 17 Wing for further assistance.
Contact Information	For any further questions or concerns about this evaluation, or if you wish a copy of the report, please contact Dr. Don McCreary, Stress & Coping Group, DRDC Toronto, 416-635-2008, 634-2008 (CSN), or **McCreary.D@forces.gc.ca**; This project has been reviewed and approved by, the Research Ethics Board at DRDC Toronto. If you would like to speak with the Chair of the DRDC Research Ethics Board, please contact Dr. Jack Landolt, 416-635-2120, 634-2120 (CSN), or **Jack.Landolt@drdc-rddc.gc.ca** DHRRE authorizes the administration of this survey within DND/CF in accordance with CANFORGEN 145/02 ADMHRMIL 079 UNCLASS 131028Z DEC 02. Authorization number: 340/04.

Annex 3: Consent Form

ADVANCED SERE COURSE HEALTH AND SAFETY EVALUATION
DRDC Toronto Human Research Ethics Committee Protocol Number (L-478)

Principal Investigator: Dr. Don McCreary
Co-Investigator: Dr. Megan M. Thompson

The DRDC Toronto Human Research Ethics Committee requires all research participants to sign a consent form. This form and all identifying personal information will be kept separate from your questionnaire data and stored by the DRDC Toronto Human Research Ethics Committee.

I, _____(name), volunteer to complete the Advanced SERE Health and Safety Evaluation. I have read the accompanying information sheet, and I understand that I will asked to complete the evaluation at three points: before the beginning of the course, at the end of the course, and 6 weeks after the course. I have been given the e-mail and mail addresses at which I can contact the principal investigator concerning the survey.

I understand that my data will be stored at DRDC Toronto and that my answers will be treated as confidential. My data will not be revealed to anyone other than authorized study investigators without my consent, except as part of group results. I understand that any information that may be used to identify me specifically (i.e., my name and address so that the follow-up survey can be mailed to me) will not appear with my data at any time, and will be destroyed upon completion of the study.

I understand that mild eyestrain, fatigue, and boredom and a temporary focus on physical symptoms such as joint pains or headaches are possible short-term risks of completing this questionnaire. I consider these acceptable.

I understand that I may withdraw from this study at any time without prejudice, and that I may skip any question that I would prefer not to answer.

PLEASE COMPLETE AND RETURN WITH YOUR QUESTIONNAIRE

Name: _____

Signature: _____

Date: _____

DHRRE authorizes the administration of this survey within DND/CF in accordance with CANFORGEN 145/02 ADMHRMIL 079 UNCLASS 131028Z DEC 02 Authorization number: 340/04

Annexe 4: SF-12 Health Questionnaire

SF-12 HEALTH SURVEY

Please answer every question by circling the answer that best describes how you feel. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5

2. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Limited a lot	Limited a little	Not limited at all
a. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:	**1**	**2**	**3**
b. Climbing several flights of stairs:	**1**	**2**	**3**

3. During the past four weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

a. Accomplished less than you would like:	Yes	No
b. Were limited in the kind of work or other activities:	Yes	No

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

a. Accomplished less than you would like:	Yes	No
b. Didn't do work or other activities as carefully as usual:	Yes	No

5. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
1	2	3	4	5

6. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks:

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a. Have you felt calm and peaceful?	**1**	**2**	**3**	**4**	**5**	**6**

b. Did you have a lot of energy?	**1**	**2**	**3**	**4**	**5**	**6**
c. Have you felt downhearted and blue?	**1**	**2**	**3**	**4**	**5**	**6**

7. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
1	2	3	4	5

Annexe 5: K-10 Psychological Distress Questionnaire

K10+ General Health Survey

The following questions ask about how you have been feeling during the **past 30 days**. For each question, please circle the number that best describes how often you had this feeling.

Q1. During the past 30 days, about how often did you feel ...		None of the time	A little of the time	Some of the time	Most of the time	All of the time
a.	... tired out for no good reason?	1	2	3	4	5
b.	...nervous?	1	2	3	4	5
c.	...so nervous that nothing could calm you down?	1	2	3	4	5
d.	...hopeless?	1	2	3	4	5
e.	...restless or fidgety?	1	2	3	4	5
f.	...so restless that you could not sit still?	1	2	3	4	5
g.	...depressed?	1	2	3	4	5
h.	...so depressed that nothing could cheer up?	1	2	3	4	5
i.	...that everything was an effort?	1	2	3	4	5
j.	...worthless?	1	2	3	4	5

List of symbols/abbreviations/acronyms/initialisms

DND	Department of National Defence
CF	Canadian Forces
ASERE	Advanced Survival, Evasion, Resistance, and Escape
CFSSAT	Canadian Forces School of Survival and Aeromedical Training

DOCUMENT CONTROL DATA
(Security classification of the title, body of abstract and indexing annotation must be entered when the overall document is classified)

1. ORIGINATOR (The name and address of the organization preparing the document. Organizations for whom the document was prepared, e.g. Centre sponsoring a contractor's report, or tasking agency, are entered in section 8.)

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3. TITLE (The complete document title as indicated on the title page. Its classification is indicated by the appropriate abbreviation (S, C, R, or U) in parenthesis at the end of the title)

Self-reported Health and Well-being Outcomes of ASERE Students (U)

4. AUTHORS (First name, middle initial and last name. If military, show rank, e.g. Maj. John E. Doe.)

Donald R. McCreary; Megan M. Thompson

5. DATE OF PUBLICATION (Month and year of publication of document.)	6a NO. OF PAGES (Total containing information, including Annexes, Appendices, etc.)	6b. NO. OF REFS (Total cited in document.)
July 2005	52	30

7. DESCRIPTIVE NOTES (The category of the document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of report, e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

Technical Report Funding for this study was provided by: Canadian Forces School of Survival and Aeromedical Training, 17 Wing/CFB Winnipeg PO BOX 17000 STN FORCES WINNIPEG MB R3J 3Y5

8. SPONSORING ACTIVITY (The names of the department project office or laboratory sponsoring the research and development - include address.)

Sponsoring: Canadian Forces School of Survival and Aeromedical Training
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(U) The 1st Canadian Air Division Surgeon requested that the Stress and Coping Group at DRDC Toronto undertake an evaluation based on the health and well-being self-reports of students taking the Advanced Survival, Evasion, Resistance, and Escape (ASERE) training course conducted at Canadian Forces School of Survival and Aeromedical Training (CFSSAT), CFB Winnipeg. Students provided their expectations and perceptions concerning the course, as well as self-reports of their health and well-being prior to the course, at the end of the course, and six weeks following the course. While most students sustained some minor injuries (e.g., bruises, cuts, scrapes, sore muscles), only 3 of the 52 study participants sustained a major injury (i.e., broken bones, torn ligaments). Also, while there was a slight drop in physical health scores (using a standardized measure) from pre- to post-course, there were no effects on the two measures of psychological well-being. Finally, questions about expectations and perceptions of the course showed that students were expecting to take a challenging course and that those expectations were met.

(U) Le médecin de l'air de la 1re Division aérienne du Canada a demandé que le Groupe du stress et des stratégies d'adaptation de RDDC Toronto procède à une évaluation basée sur les auto?évaluations de leur santé et de leur bien?être par les participants au cours de formation sur les procédures avancées de survie, d'évasion, de résistance et de fuite (SERF), donné à l'École de survie et de médecine de l'air des Forces canadiennes (ESMAFC), BFC de Winnipeg. Les stagiaires ont exprimé leurs attentes et leurs perceptions concernant le cours, de même qu'ils ont fourni leur évaluation de leur santé et de leur bien?être avant le cours, à la fin du cours et six semaines après la fin du cours. Bien que la plupart des stagiaires aient subi des blessures mineures (p. ex. ecchymoses, coupures, éraflures, douleurs musculaires), seulement trois des 52 participants étudiés ont subi une blessure grave (c.?à?d. fractures, ligaments déchirés). De plus, bien qu'on ait observé (au moyen d'une mesure normalisée) des scores légèrement plus faibles dans l'évaluation de la santé physique à la fin du cours comparativement à ceux indiqués avant le cours, aucun effet n'a été révélé par les deux mesures du bien?être psychologique. Enfin, les questions sur les attentes et les perceptions concernant le cours ont démontré que les stagiaires s'attendaient à suivre un cours exigeant et que ces attentes ont été satisfaites.

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(U) Advanced Survival, Evasion, Resistance, and Escape (ASERE); Health and Well-Being; Air Crew

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